Progress Report
Pacific Islands Regional Integrated Ocean Observing System (PacIOOS)

Submitted by
Eric Wong, East-West Center
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1.0 Progress on Regional Association Development

This report covers the period from June 1, 2006 through November 30, 2006. The notice of award for first-year funding for the Pacific Islands Integrated Ocean Observing System (PacIOOS)[1] was received on July 29, 2005 although the official start date on the grant is listed as June 1, 2005. This grant began the formal process of planning for the development of a Pacific Islands IOOS program and the Regional Association governance structure that will support it.

PacIOOS activities during this performance period addressed the following objectives associated with the emergence of an effective Pacific IOOS regional program:

- **Ensure broad engagement of key stakeholders and partner institutions** in the development of an initial Pacific IOOS program with continuing efforts to assess progress, address problems and explore new opportunities;

- **Identify critical information needs** in the high-priority areas described above including completion of an inventory of existing observing systems and information products, the identification of critical gaps and the development of recommendations for new or enhanced ocean information products; and

- **Establish appropriate program oversight, coordination and implementation mechanisms** to support a Pacific IOOS regional program.

Key activities and highlights of accomplishments during this performance period include:

- Continued discussions with University of Hawaii scientists, private sector firms and Federal agencies to further define and develop their interest in and potential contributions to a Pacific Regional IOOS/GCOOS program. UH/SOEST staff accelerated their efforts to develop plans for a Hawaii-focused ocean observing system that would address high-priority state needs and become a core, sub-regional component of PacIOOS;

[1] PacIOOS is being designed to address ocean observations requirements and priorities in the American Flag Pacific Islands (Hawaii, Guam, American Samoa and the Commonwealth of the Northern Mariana Islands) and the U.S. Affiliated Pacific Islands including the Federated States of Micronesia, the Republic of the Marshall Islands and the Republic of Palau.

- University of Hawaii School of Ocean and Earth Sciences and Technology (UH/SOEST) Dean, Brian Taylor, assumed responsibility as the second member of the National Federation of Regional Associations (NFRA) for PacIOOS and, under his leadership, UH/SOEST has begun to assume increasing responsibilities for PacIOOS as initial steps toward their long-term leadership for PacIOOS and the Hawaii Ocean Observing System that is expected to be a significant component of PacIOOS. Margaret McManus of UH/SOEST was appointed as PacIOOS Coordinator;

- With Eileen Shea's appointment to Director of the NOAA IDEA Center, Eric Wong assumed duties as the EWC Principal Investigator (PI) on the PacIOOS planning grant. Eileen will remain involved in the development of PacIOOS especially during the period of transition;

- Continued to support the work of the Observations and Data Management Hui of the Pacific Risk Management 'Ohana (PRiMO) to identify risk management information needs and priorities and move towards completion of an inventory of ocean observing systems supporting risk management in the PacIOOS region;

- Supplemented the PRiMO inventory effort in the context of weather and climate-related risks through discussions with key climate partner programs and institutions including NOAA/NWS, NOAA/NESDIS, UH/SOEST and University of Hawaii International Pacific Research Center (UH/IPRC) and the initiation of a regional observations inventory in the climate theme area;

- Initiated discussions with key partners in marine and coastal ecosystem research and management including NOAA/NMFS, NOAA/NOS-Sanctuaries, UH/SOEST, UH/Hawaii Institute for Marine Biology (UH/HIMB) in order to (1) undertake a regional inventory of ocean and coastal observations in this theme area; and (2) explore critical information needs and opportunities for collaboration in a PacIOOS context;

- Continued development of an appropriate PacIOOS governance structure that will be vetted with regional partners and stakeholders in the third year of the PacIOOS planning grant which will begin on June 1, 2007;

- Continued support for the Pacific Islands Global Ocean Observing System (PI-GOOS dialogue and joint planning with the PI-GOOS Program Officer at the South Pacific Applied Geosciences Commission (SOPAC);

- Continued support for the Pacific Islands Global Climate Observing System (PI-GCOS) through and joint planning with the PI-GCOS Program Officer at the Secretariat for the Pacific Regional Environment Programme (SPREP);

- Continued a collaborative working relationship with the NOAA Integrated Data and Environmental Applications (IDEA) Center through which IDEA Center staff continue to support education/outreach and data management activities during the development phase of PacIOOS;

- Continued work with PRiMO, NOAA IDEA Center, NOAA Pacific Services Center (PSC), and Pacific Disaster Center (PDC) to advance the development of a wave and water level product line as an early PacIOOS priority in response to deliberations of the PRiMO Observations and Data Management Hui (working group). This work built on a December 2005 Wave and Water Level Hazards Data Framework Workshop. The Workshop was organized to advance the objective of aligning wave and water level data collection, archiving, integration and sharing throughout the Pacific Region. A Workshop summary, presentations and background material can be found at the PacIOOS website (http://research.eastwestcenter.org/PacIOOS/wwl.html);

- In the context of this wave and water level product suite, continued activities in support of the development and implementation of a prototype XML Web Service to support tsunami detection and warning. Specifically, IDEA Center, PDC, and NOAA Pacific Tsunami Warning Center (PTWC) staff met with International Oceanographic Data and Information Exchange (IODE) and Global Sea Level Observing System (GLOSS) Intergovernmental Oceanographic Commission (IOC) staff to coordinate ongoing activities related to an XML schema and accompanying client application development in this area. Meetings for FY 06 PRIDE "Wave and Water Level Web Service for Pacific Tsunami Warning Center" with PDC, PTWC, and NOAA IDEA Center staff to confirm schematics for mapping message products into WWL schema for the prototype web service are also relevant in this regard;

- Also in the context of work on the wave and water level product line, convened a Pacific Region Integrated Data Products (PRICIP) Expert Teams Workshop in late June. This workshop brought together more than 25 recognized experts in the area of climate-related processes that govern storminess and its expression as heavy rains, strong winds, and high seas in the Pacific region. It served as a detailed scientific planning meeting for a coastal climatologies regional demonstration project to support the emergence of a national coastal climatology program. The wave and water level product development efforts fall under the category of high seas in the context of this broader coastal climatology effort being undertaken by the NOAA IDEA Center in collaboration with PacIOOS and other partners. A PRICIP Program Integrated Team meeting was held in mid December. This meeting involved the theme leads and focused on identification of potential tailored information products and their linkage to and the refinement of derived data product work plans. Workshop presentations, reports and background material can be found at the PacIOOS ftp site (http://research.eastwestcenter.org/ideacenter/PRICIP%20Workshop%20folder/);

- Continued enhancement of the PacIOOS website through the addition of new materials, links and documentation related to the development of PacIOOS and initial PacIOOS product lines (http://research.eastwestcenter.org/PacIOOS);

- Contributed to ongoing surveys of regional programs and needs in support of the IOOS program including participation in a telephone interview by representatives of Raytheon in support of a NOAA IOOS planning contract as well as discussions with staff of the NOAA Coastal Services Center (CSC) as part of their ongoing assessment of regional needs for CSC technical support;

- Continued discussions with potential partners in PacIOOS education and outreach activities including NOAA PSC, Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS), Northwest Hawaiian Islands National Monument (NWHINM), Pacific Resources for Education and Learning (PREL), Hawaii Sea Grant, Hawaii State Department of Health, Hawaii State Department of Education, Centers for Ocean Sciences Education Excellence **(**COSEE), and other IOOS regional associations;

- Continued to develop a hazards inventory of education and outreach materials and efforts. This will be an ongoing effort to benefit PRiMO's Education and Outreach Hui as well as support PacIOOS education and outreach work in the area of risk management;

- Continued discussions with scientific staff responsible for developing a Pacific National Ecological Observatory Network (NEON) program of terrestrial ecosystem observations in the American Flag and U.S. Affiliated Pacific Islands regarding potential areas of collaboration. In addition, PacIOOS staff attended the Hawaii EPSCoR (Experimental Projects to Stimulate Competitive Research) workshop on "Cyberinfrastructure for Integrated Earth Observing Systems" and provided a PacIOOS program briefing. The goal of the workshop was to convene a transdisciplinary team of ecologists, engineers, information technology scientists involved in EPSCoR to discuss the role of new cyberinfrastructure technologies being developed;

- Participated in a Quality Attribute Workshop (QAW) on August 3 at Monterey Bay Aquarium Research Institute (MBARI) sponsored by Raytheon and co-hosted by Central and Northern California Ocean Observing System (CeNCOOS). As part of Raytheon's development of a conceptual design for IOOS, the QAW was held to assess the viability of their proposed design. The QAW process brought together stakeholders from across the IOOS enterprise to review representative scenarios and to characterize key functional or performance attributes that can impact the outcome of the scenarios;

- Participated in the NFRA-hosted Remote Sensing Workshop held on October 3-5 at the University of New Hampshire. The workshop's goals were to identify and document remote sensing requirements of the Regional Associations;

- Participated in the annual IOOS Regional Implementation Meeting and a NFRA meeting in Chicago, IL the week of November 6, 2006;

- Submitted a PacIOOS overview that was used as the lead article in the Ocean.US December newsletter;

- Continued monthly PacIOOS program status meetings with Darcee Killpack, NOAA/PSC, the PacIOOS Technical Program Officer for the CSC IOOS Grant.

2.0 Priorities for Observations from a Regional Perspective

No significant changes to the general priorities described in the November 2005 semi-annual Progress Report.

Participation in the deliberations of the PRiMO Observations and Data Management Hui and discussions with the All Islands Coastal Zone Management group confirmed the importance of the development of enhanced information on wave and water level risks which are being addressed as an initial PacIOOS and PRiMO priority. PacIOOS is moving forward on this front and updates on progress will continue to be made available on the PacIOOS website.

Deliberations during the introductory PacIOOS workshops throughout Micronesia reinforced the initial data and information priorities identified during the September 2005 symposium in American Samoa and reported on in the November 2005 semi-annual report. As noted earlier, summaries of the information needs and priorities identified during these symposia will be posted on the PacIOOS website.

As noted in previous semi-annual reports (March 2005 and November 2005), the Pacific IOOS team believes that *one of the highest priorities for FY07 and beyond is the explicit identification of sufficient funding for the Regional Program component of IOOS* as well as National Backbone funding priorities in Agency budget requests to Congress. This includes, as a high priority, securing the legislative and executive branch authorities to move from the current funding situation to a truly national program with sufficient funding for full national coverage in both planning AND implementation of regional IOOS programs.

3.0 Issues, Challenges and Opportunities

- PacIOOS will continue to explore exciting opportunities to link Pacific IOOS ocean ecosystem observing and data management activities with similar observational and data management interests of the *NEON program* that focuses on long-term observations of terrestrial ecosystems. The Hawaiian resource management concept of ahupua'a – from the mountain ridge to the outer edge of

the coral reef – acknowledges the importance of addressing resource management and ecosystem health issues in an integrated fashion in the coastal zone. One specific area of shared interest is in meeting the data integration and visualization challenges that both programs face.

- The Pacific IOOS team continues to be involved in the development of a Pacific Islands Climate Information System (PaCIS) in the context of identifying and addressing climate-related aspects of Pacific IOOS. A PaCIS program framework describing the integration of climate observations, forecasting, research, research, modeling, assessment, data management and education is currently being developed. In addition to providing regional climate services to American Flag and U.S. Affiliated Pacific Islands, PaCIS is being developed in the context of a U.S. contribution to the emergence of a Regional Climate Centre for Oceania under the auspices of the World Meteorological Organization (RA V). PaCIS has also been identified as a high-priority PRiMO activity in 2007.

- Consistent with the RA consensus on the need to fully fund regional planning activities at funding levels greater than are currently available, the Pacific IOOS team would like to draw attention to the increasing demands for time, people and money to contribute to a variety of implementation activities at the national level such as the IOOS demonstration project, Data Management and Communications (DMAC), national-level education planning, etc. These activities are placing increasing demands on already over-constrained Regional budgets and personnel.